# TM-10
# CATV/TV Level Meter
# User's Manual

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# Operating Safety Precautions

## ■ Introduction

Thank you for purchasing our product. Electronic measuring instruments produced by us are high technology products made under strict quality control. We guarantee their exceptional precision and utmost reliability. To ensure safe operation of this instrument, be sure to follow the warning and precautions provided as bellow.

## ■ Warning

- Do not use this product or equipment connected to it in an explosive, ignitable, or flammable atmosphere, as this will result in the risk of explosion.
- Do not connect this product to a piece of equipment or cable having a voltage with respect to ground on its chassis, as such connection can result in the risk of electrical shock.
- Use a proper Battery charger for charging internal rechargeable battery pack.

## ■ Caution

- Do not remove the case cover, as this can risk failures or loss of performance.
- Do not allow water to enter the product. This product is not waterproof.
- If condensation forms on this product due to a sudden change in temperature, use this product only after allowing it to dry sufficiently.

# Table of Contents


1. Product Description **1-1**

1.1 Introduction ..... 1-1
1.2 Features ..... 1-1
1.3 Technical Specification ..... 1-2

2. Installation **2-1**

2.1 Initial Inspection ..... 2-1
2.2 Charging and Discharging Instruction ..... 2-1
2.3 Cooling and Ventilation ..... 2-1

3. Operating Procedure **3-1**

3.1 Function Panel Description ..... 3-1
3.2 LCD Panel Description ..... 3-4
3.3 Basic Operation ..... 3-6
3.3.1 Connecting with CATV System ..... 3-6
3.3.2 Connecting with UHF/VHF Antenna ..... 3-7
3.3.3 Change of Frequency to measure ..... 3-8
3.3.4 Selection of Video/Audio measurement ..... 3-8
3.3.5 Setup Function of measurements ..... 3-9
3.3.6 Setup Audio subcarrier(fs-fp) band width ..... 3-9
3.3.7 Unit Selection ..... 3-10
3.3.8 Change of Channel Number ..... 3-11
3.3.9 Storing of new channel with changed settings ..... 3-11
3.3.10 Recalling of stored channel ..... 3-12
3.3.11 Indicating the level of internal battery ..... 3-12

## Table of Contents


3.4 Level Measurement procedure ..... 3-13
3.4.1 Measure with stored channel and conditions ..... 3-13
3.4.2 Measure by setting conditions ..... 3-13
3.4.3 Measurement of Audio level ..... 3-13
3.4.4 Measurement of Voltage from Cable line ..... 3-14

3.5 Additional Functions ..... 3-15
3.5.1 Peak Holder ..... 3-15
3.5.2 Acoustic signal strength monitoring ..... 3-15
3.5.3 Last channel and condition memory ..... 3-15
3.5.4 Back lighting for LCD Display ..... 3-15
3.5.5 Auto Power off ..... 3-15

**4. Maintenance** **4-1**

4-1. Adjustment and Calibration ..... 4-1
4-2. Battery charging ..... 4-1
4-3. Cleaning and Decontamination ..... 4-3

# 1. Product Description 1-1

**1.1 Introduction**

This professional CATV/TV Level Meter has been designed for the installation and maintenance of Cable TV and VHF/UHF TV system. The inside circuitry and mechanical design has been carefully developed in order to obtain very light, slim typed field strength meter. To allow the installer to work in the best conditions, it is also offering built-in power (rechargeable battery) and hang-on-the neck type carrying case. The LCD display with Back-light is shown several kinds of information such as Frequency, Measuring level, Function, units and bar graph. The compact metal cabinet will be a right choice for heavy-duty field use. It is a real instrument to measure, verify and optimize Cable TV and VHF/UHF TV systems at any stage of installation.

**1.2 Features**

- Handheld, portable CATV/TV SIGNAL STRENGTH METER
- PLL tuning control for Frequency Selection (From 5MHz to 862MHz)
- Audio Sub-Carrier frequency selection (4.5MHz, 5.5MHz, 6.0MHz, 6.5MHz)
- AC/DC Voltage measurement (Up to 70 V)
- Built in Rechargeable Battery pack for powering
- Auto power off
- 99 Favorite Channel memory
- Peak holder function for detecting Max. Input level Display
- Buzzer for Acoustic signal strength monitoring
- Multi LCD display with Back light
- Last condition Store & memory
- Key Entry control
- Deluxe HANG-ON-NECK type CARRYING CASE for hand-free use

### 1.3 Technical Specifications

| | |
|---|---|
| • Measuring Frequency Range | 5 to 862 MHz |
| • Frequency Tuning Resolution | 250 kHz |
| • Frequency Tuning Method | PLL Frequency Synthesizer |
| • Level Measurement | |
| - Measuring Range | 30 to 120 dBuV |
| - Resolution | 0.1 dB |
| - Accuracy | ± 3 dB (0 to 40°C) |
| • RF Input | F type, 75 ohm |
| • Audio sub-carrier(fs-fp band width) | A; +4.5MHz, B: +5.5MHz, C: +6MHz, D: +6.5MHz |
| • DC Voltage Measurement | 70V |
| • AC Voltage Measurement | 70V |
| • Favorite Channel Memory | |
| - Number of channels | 99 |
| - Storable Items | Frequency: 5MHz to 862MHz in 250kHz step<br>Function: Video, Peak holder, Sound<br>Unit of Level: dBuV, DC V<br>Audio Sub-carrier:<br>A;4.5MHz, B:5.5MHz, C:6MHz, D:6.5MHz |

## Technical Specification 1-3

| | | |
|---|---|---|
| • Auto power off | Preset to 10 Minutes | |
| • Internal Power | | |
| - Capacity of Rechargeable Battery | 12V/1200mA AH (Metal Hydride) | |
| - Battery Life | 3 HRS | |
| • Power requirement for charging | DC12V 500mA (Charge & Adaptor) | |
| • Display | Multi LCD Display with Back-light<br>Frequency, Channel, Level, dBuV, VDC, VAC<br>Function, Battery level, Audio Sub-Carrier BW,<br>Bar Graph | |
| • Environmental Conditions | | |
| - Operating Temperature Range | 0 to 40 °C | |
| - Operating Humidity Range | 30 to 85 % RH | |
| - Storage Temperature Range | -10 to 50 °C | |
| • Dimensions and Weight | 180(W) x 75(H) x 150(D) mm<br>Approx. 1.5 kg | |
| • Supplied Standard Accessories | Battery Charger (12V 500mA) | 1 |
| | Carrying Case | 1 |
| | User’s Manual | 1 |

# 2. Installation 2-1

**2.1 Initial Inspection**

This instrument was carefully inspected both mechanically and electrically before shipment. It should be physically free of damage. To confirm this, the instrument should be inspected for physical damage in transit. Also, check for supplied accessories.

**2.2 Charging and Discharging Instruction**

a. New batteries are supplied in an uncharged state. To ensure the maximum battery performance, a new battery (or long time not-used-battery) should be charged for at least 10 hours before use.

b. A new battery will require several full-charge/discharge cycles in order to achieve its optimum performance. After 1st full charge, use battery until full discharge level, and 2nd charge to full level, Repeat this cycle several times before starting the main use of battery.

c. Best battery performance will be achieved when you regularly charge and discharge batteries.

d. If left unused, a fully charged battery will discharge itself in approximately one month.

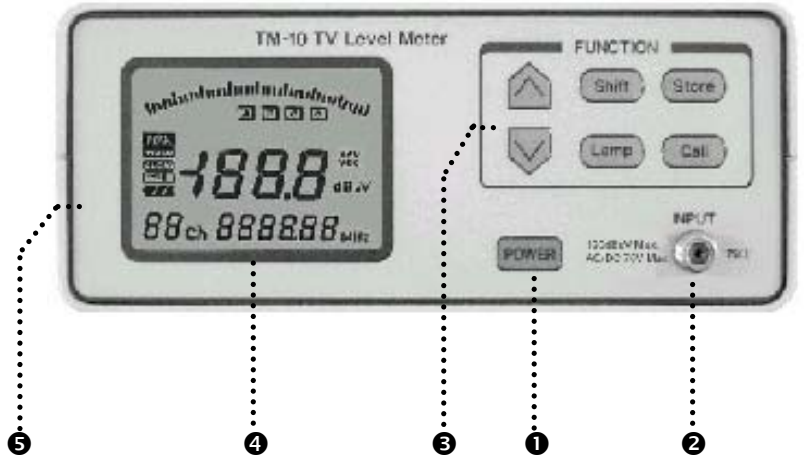
**** Please refer to "4.2 Battery Charging, page 4-1" for the details of charging method.**

**2.3 Cooling and Ventilation**

No special cooling and ventilation is required. However, the instrument should be operated where the ambient temperature is maintained.

## 3. Operating Procedure 3-1

### 3.1 Front Panel Description



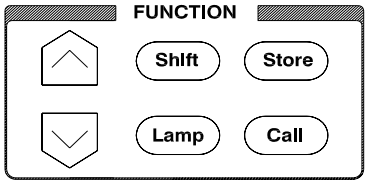
## Front panel Description 3-2

❶ Power; Power on / off (Momentary switch). Turning on the power with beep sound when the switch is pressed.

❷ Input Terminal; Accepts signal from CATV system(Wall plate, Head-end system and etc.) or signal from VHF/UHF antenna.

**Caution**
**Maximum input is**
**Signal: 120dBuV**
**AC/DC Voltage: 70V.**
**Excessive voltage can damage to internal circuit.**

❸ Function;

| | |
|---|---|
| - Set the frequency, Function, Output Signal and units.<br>- Store the function and data for desired channel and call the stored channel.<br>- Turning on back-light. |  |

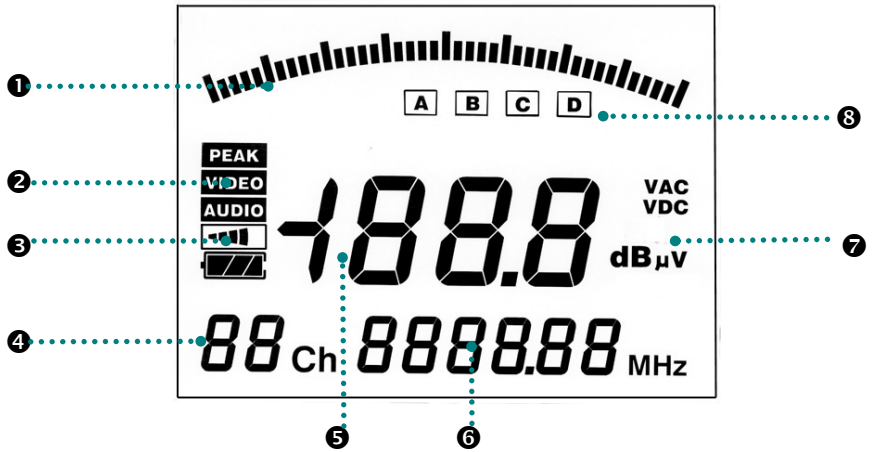
| | |
|---|---|
| Shift | Use to select the function of Up/Down key.<br>(Frequency, Channel, Function, Audio Sub-carrier, unit) |
| Store | Use to store the desired conditions of each channel**(push two times)**<br>(Frequency, Function, Audio Sub-carrier, measuring unit)<br>Use to change the measuring conditions in selected channel momently<br>**(push one time)** |
| Call | Use to call stored channel |
| Lamp | Use to turn on and off back light |
| (Up)<br>(Down) | Use to change the value in selected function by Shift key.<br>**- Change of Frequency (From 5MHz to 862MHz in 250kHz step)**<br>**- Change of Channel (CH 01,02,… up to 99)**<br>**- Change of function (Video/ Audio, Normal/ Peak holder/ Sound)**<br>**- Change of Audio sub-carrier(fs-fp BW) (A,B,C,D)**<br>**- Change of measuring unit (dBuV, VDC/VAC- Auto selection by input voltage)** |

❹ LCD Display; Displays measurement level and various information.

❺ DC INPUT for charging internal battery pack;

Accepts external DC power from AC adaptor and Cigar socket of Car for charging internal battery pack. When the AC Adaptor is used for charging, DC 12V 500mA is required. The input power jack could be accepting with center plus (+).

### 3.2 LCD Panel Description




❶ Bar-Graph;
Displays signal level. Minor division indicates 2.25 dBuV. Same quantities of bar will be displayed with input level from 30dBuV to 120dBuV.

❷ Video/Audio
Displays Video or Audio level measurement

## LCD Panel Description 3-5

❸ Function (Peak holder/Sound, Battery level)
Displays selected function (Peak/Sound) and
the level of internal battery pack.

❹ Channel
Displays selected channel number.

❺ Level
Displays signal level with dBuV and
Line voltage from Cable with VDC and VAC.
*** VDC/ VAC is selected automatically according to input voltage**

❻ Frequency
Displays selected Video carrier frequency.

❼ Units
Displays selected units
(dBuV for level, VDC or VAC for Voltage)

❽ Audio sub-carrier(fs-fp band width)
Displays selected audio sub-carrier
A; +4.5MHz, B: +5.5MHz, C: +6MHz, D: +6.5MHz

### 3.3 Basic Operation

#### 3.3.1 Connecting with CATV System

Connect the signal from CATV system(Wall plate, Head-end system or others) to INPUT Connector of this meter using a 75ohm coaxial cable.(See figure 3-1)

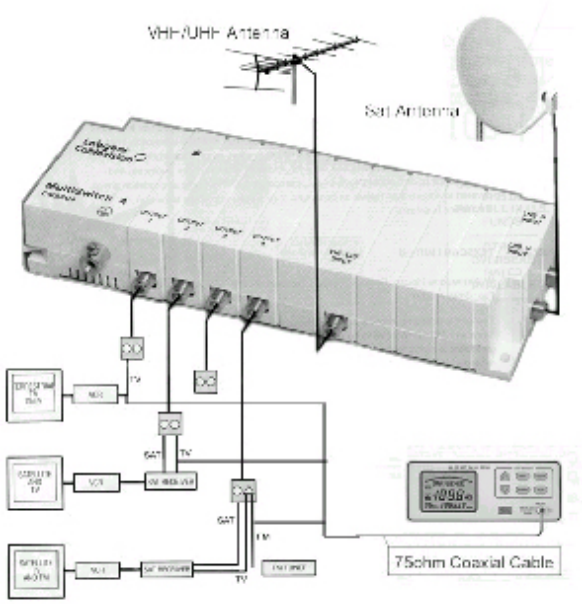



**Fig. 3-1 Connecting with LNB**

### 3.3.2 Connecting with UHF/VHF Antenna

Figure 3-3 is shown a set-up example for Connect the signal from UHF/VHF Antenna to INPUT Connector of this meter using a 75ohm coaxial cable.

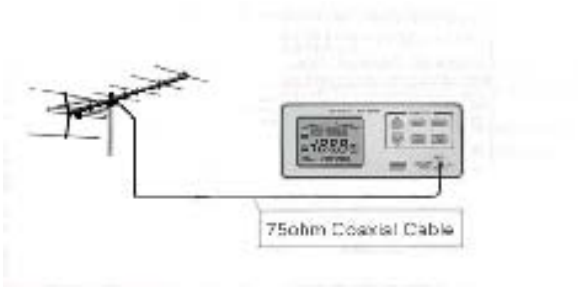



**Fig. 3-3 Setup for Multi-Site viewing**

### 3.3.3 Change of Frequency to measure

The frequency can be changed in initial status of operation and after selecting Channel.

a. Select desired frequency to measure level by using “Up/Down” key. (5MHz – 862MHz with 250kHz step)

**** The frequency change is speed up by pressing “Up/Down” key for fast change of frequency.**

b. Move to other selecting function by using “Shift” key or push “Store” key(two times) to store.

### 3.3.4 Selection of Video/Audio measurement

The Audio level can be measured and displayed as follow;

a. Move to “Video/Audio” selection by using “Shift” key. “Video” will be blinking.

b. Select “Video” or “Audio” function by using “Up/Down” key.

c. Move to other selecting function by using “Shift” key.

**NOTE: Audio function cannot be stored in channel memory. . It can be selected momently for measuring “Audio Level”. The default setting of level is “Video”.**

### 3.3.5 Setup Function of measurements

The measuring function (Normal, Peak Holder, Sound monitoring) can be selected.

a. Move to “Function” selection group by using “Shift” key. Function group will be blinking.

b. Select desired function by using “Up/Down” key.

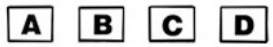
- Sound: Acoustic signal strength monitoring
- Peak Holder: Displayed Measuring level is changed when new measuring level is higher than previous measured value.
- Normal: Displayed Measuring level from input terminal.

**(Blank of Function display)**

c. Move to other selecting function by using “Shift” key or push “Store” key(two times) to store.

### 3.3.6 Setup Audio subcarrier(fs-fp) band width

To measure Audio level correctly, check the **Audio subcarrier(fs-fp) band width** required in TV system of each country. (+4.5MHz, +5.5MHz, +6.0MHz, +6.5MHz)



a. Move to “**Audio subcarrier**” selection group by using “Shift” key. “A” will be blinking.

A

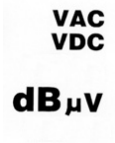
b. Select desired **Audio subcarrier(fs-fp) band width** by using “Up”“Down” key.

**A: +4.5MHz, B: +5.5MHz, C: +6.0MHz, D: +6.5MHz**

c. Move to other selecting function by using “Shift” key or push “Store” key(two times) to store

### 3.3.7 Unit Selection

The units of level(dBuV ) and unit of voltage(VDC/VAC) can be selected for using desired unit.




a. Move to “Unit” selection group by using “Shift” key. Unit group will be blinking.

b. Select desired unit by using “Up” “Down” key. (dBuV, VDC)

c. Move to other selecting function by using “Shift” key.

**** When the “VDC” is selected, the voltage value from cable will be measured. VDC and VAC will be selected automatically according to input voltage.**

**3.3.8 Change of Channel Number**

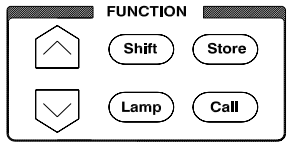
a. Move to “Ch” selection by using “Shift” key. “Ch” will be blinking.

b. Select desired channel by using “Up” “Down” key. (Ch 01…99)

c. Move to other selecting function by using “Shift” key or push “Store” key(two times) to store.

**3.3.9 Storing of new channel with changed setting**

After setting each function and measuring level, the selected conditions can be stored in desired Channel from 01 to 99.




a. Set up all required conditions (Frequency, Function, Audio sub-carrier, unit) according to the set-up procedures from 3.3.3 to 3.3.7.

b. Select desired channel number to store. (Refer to 3.3.8)

c. Store Channel by using “Store” Key(two times).

d. To store other new channels, proceed from “a” to “c”.

**** All of channels are set to initial conditions before shipment(Video, Normal, A, dBuV). So it should be set and stored for the requirements of customer.**

### 3.3.10 Recalling of stored Channel

**To measure input level with conditions of stored channel,**

a. Press “Call” key to select desired channel.
The “Ch” will be blinking.

b. Select desired channel by using “UP”, “DOWN” key.

c. Press “Call” key again to apply the conditions of selected channel..

### 3.3.11 Indicating the level of internal battery ( )

The level of internal battery is displayed on “Battery indicator”.
Refer to following table for the status of battery.

| Battery sign of Indicator | | Time for use |
|---|---|---|
| | Three bars of indicator | Approx. 3 hrs. |
| | Two bars of indicator | Approx. 1.5 hrs. |
| | One bar of indicator | Approx. 30 min. |
| | Blinking Indicator | **Need to charge** |
| Auto Power off with beep sound | | |

## 3.4 Level Measurement Procedure

### 3.4.1 Measure with stored channel and conditions

a. Select desired channel by using "**Call**", "**Up/Down**", **"Call"** key.
b. Connect the cable to Input terminal.
c. Read "The value of input level" on Display.

### 3.4.2 Measure by setting the conditions

a. Select desired frequency to measure by using "**Up/Down**" Key.
Refer to "**3.3.3 Change of Frequency**".
Select the desired conditions(Function, Unit)
by using "**Shift**", "**Up/Down**" Key.
Refer to **"3.3.4 to 3.3.6"**.
b. Push **"Store"** key one time to hold measuring conditions momently.
c. Read "The value of video level" on Display.
d. Return to previous measuring condition by pushing **"Call"** key(two times).

### 3.4.3 Measurement of Audio level of selected channel

The Audio level can be measured and displayed as follow;

a. Move to "Video/Audio" selection by using "Shift" key. "Video" will be blinking.
b. Select "Audio" function by using "Up/Down" key.
c. Push **"Store"** key one time to hold measuring conditions momently.
d. Read "The value of Audio level" on Display.
e. Return to previous measuring condition by pushing **"Call"** key(two times).

**NOTE: "Audio" function cannot be stored in channel memory. The default setting of level measurement in each channel is "Video". Even though "Audio" is selected, it will be stored to "Video" automatically.**

**3.4.4 Measurement of Voltage from Cable line**

The value of voltage from cable line can be measured as follows;

a. Select Unit group by using **"Shift"** key.
b. Select **"VDC"** by using **"Up,Down"** Key.
c. Push **"Store"** key one time to hold measuring conditions momently.
d. Read Input voltage from cable line.
**(VDC and VAC will be selected automatically according to input voltage.)**
e. Return to previous measuring condition by pushing **"Call"** key(two times).

**NOTE: "Store" Key operation**

**The "Store" key can be used for storing the selected information of channel (Frequency, Function, Audio sub-carrier, Unit) and also it can be used to hold changed measuring conditions of selected channel momently without storing.**

- **To store selected information: Push "Store" *two times***
  **This operation can be used to set-up or change measuring conditions of each channel.**
- **To hold selected condition momently: Push "Store" *one time***
  **This operation can be used to change measuring methods and units momently during measuring without changing stored conditions.**
  **Return to stored measuring condition by pushing "Call" key two times.**

## 3.5 Additional Functions

### 3.5.1 Peak Holder ( PEAK )

This meter has “Peak Holder function” to support easy installation of antenna system by detecting highest input level. The displayed measuring level is changed when new measuring level is higher than previous measured value.
To set this function, see to 3.3.4.

### 3.5.2 Acoustic signal strength monitoring ( )

This meter has acoustic signal strength monitoring function to support easy installation of antenna system by hearing the strength of input signal. The beef sound with 1kHz is varied according to the value of input level. To set this function, see to 3.3.4.

### 3.5.3 Last channel and conditions memory

When the meter turns off, the meter can memory last channel and conditions for supporting same conditions with previous measuring.
When the power is turning on by pushing “Power” key, the previous channel and conditions are applied again.

### 3.5.4 Back Light for LCD display

To read the display in dark area, the back light is turning on by pushing “Lamp” button. To turns off back light, push “Lamp” button again.

### 3.5.5 Auto Power off

When the voltage of internal battery pack is less than proper voltage and the operation of meter is stopped more than 10 minutes, the power is turning off automatically for saving internal power. When the power is turning on by pushing “Power” key, the previous channel and conditions are applied again.

# 4. Maintenance 4-1

### 4.1 Adjustment and Calibration

It is recommendable to regularly adjust and calibrate this meter. Qualified and authorized personnel only should execute performance and procedures.
When the calibration or service is required, contact with our local agent.

### 4.2 Battery charging

**CAUTION and NOTE** that the battery should be fully charged after first opening the box. The first time charging is important. Always keep the battery level fully charged before and after use. For charging, we recommend you following ways.

#### 4.2.1 Charging by AC adaptor (Figure 4-1)

The 12V 500mA DC is recommendable for charging. The input power jack could be accepting with center plus (+). Connect adaptor as follows. Charging time is subject to the condition of battery pack.

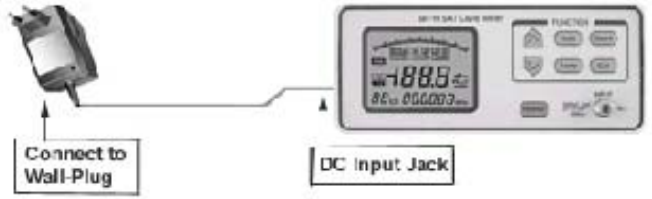



**Fig. 4-1 Charging by AC adaptor**

**4.2.2 Charging by power from Cigar-Socket of car (Figure 4-2)**

The internal battery of this meter can be charged form Cigar-Socket of car. The out voltage of Cigar socket should be higher than 12VDC. Connect the power from Cigar socket as follows. Charging time is subject to the condition of battery pack.

**Fig 4-2 Charging by power from Cigar-Socket of car**

## NOTE: Charge/Discharge instruction

- **For a new or longtime-not-used battery, you should do the complete charge to Max. and exhaust (use) completely.**
- **Do not leave the battery connected to a charger more than one day.**
- **Battery is gradually wearing out. If the operation time is noticeably shorter than normal, it is time to buy a new battery.**

### 4.3 Cleaning and Decontamination

The instrument can be cleaned with a soft clean cloth to remove any oil, grease or grime. Never use liquid solvents or detergents. If the instrument gets wet for any reason, dry the instrument using low-pressure clean air at less than 25 PSI. Use care and caution around the window cover areas where water or air could enter into the instrument while drying.